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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/761,408

01/22/2004

Steven E. Hill

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04/25/2006

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EXAMINER

VAN ROY, TOD THOMAS

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 04/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/761,408

Applicant(s)

HILL, STEVEN E.

Examiner

Tod T. Van Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/16/04, 02/28/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed 08/16/2004 has a number of documents that have not been considered due to incorrect document numbers.

Specification

The disclosure is objected to because of the following informalities:

Page 18 of the specification refers to a fig.10 that is not present in the current application.

Appropriate correction is required.

Claim Objections

Claims 20, and 33 are objected to because of the following informalities:

Claim 20 repeats the word laser twice, claim 33 appears to be dependent from claim 29 but is no labeled as so (examined as being dependent as written, from claim 20).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claim 37 recites the limitation "the substrate" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19-20, 22-25, 27-28, and 32-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhao et al. (US 20030118064).

With respect to claims 19-20, Zhao discloses an optical laser comprising REDGIVN (Rare Earth Doped Group IV Nanocrystal) material (fig.3, [0005]), at least one waveguide (fig.3 #110) comprising REDGIVN material, at least one feedback element defining a laser resonator cavity (fig.3 facets) so that the laser light is output from the waveguide when pumped, a pump source (fig.3 YAG laser).

With respect to claim 22, Zhao further discloses the pump source is an electrical pump source (fig.5).

With respect to claim 23, Zhao further discloses a substrate and/or bottom cladding below the waveguide (fig.3 #102/104) and a top cladding (fig.3 #108).

With respect to claim 24, Zhao further discloses the laser cavity has a size, which is tuned to an excitation wavelength of the rare earth dopant (fig.3, inherent for device operation with the Er doping).

With respect to claim 25, Zhao further discloses the feedback element to comprise a first highly reflective mirror (fig.3 back facet), and a second output coupler mirror that is partially reflective (fig.3 front output facet, also films [0060]).

With respect to claim 27, Zhao further discloses the feedback elements are frequency selective, and are tuned to be most reflective near a resonant frequency of the cavity (fig.6, grating [0064-66]).

With respect to claim 28, Zhao further discloses means for varying the wavelength reflected by the feedback element and varying the effective length of the resonator cavity to thereby tune the laser to a selected wavelength (grating, wherein the pitch of the grating chosen effects the wavelength, grating material's index changes effective cavity length, also influencing wavelength).

With respect to claim 32, Zhao further discloses a diffraction Bragg grating formed into or close to the waveguide (fig.6) is used to tune the wavelength of light supported in the waveguide cavity (inherent grating function).

With respect to claim 33, Zhao further discloses the resonance characteristics of the waveguide cavity is individually selected by varying the pitch of the reflection grating used to define the cavity which, along with the effective refractive index for the propagated optical mode, determines the wavelength of light reflected by the grating (see rejection to claim 28).

With respect to claim 34, Zhao further discloses a surface-relief grating forming a distributed Bragg reflection grating fabricated on a surface of the waveguide (fig.6, grating formed on bottom surface of waveguide).

With respect to claim 35, Zhao further discloses a conductive substrate having a first electrical contact (fig.5 #102), a transparent conductive cladding buffer (fig.5 #104), a layer comprising the waveguide (fig.5 #110), a second electrical contact on top of the

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REDGIVN channel (fig.5 p+ electrode), and electrical pump source (inherently present for electrical excitation).

With respect to claim 36, Zhao further discloses the feedback element to comprise a first highly reflective mirror (fig.3 back facet), and a second output coupler mirror that is partially reflective (fig.3 front output facet, also films [0060]).

Claims 19-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Korgel (US 20030034486).

With respect to claims 19-20, Korgel discloses an optical laser comprising REDGIVN (Rare Earth Doped Group IV Nanocrystal) material (fig.9, [0148]), at least one waveguide (fig.9 #80) comprising REDGIVN material, at least one feedback element defining a laser resonator cavity (fig.9 #84/86) so that the laser light is output from the waveguide when pumped, a pump source (fig.9 #88).

With respect to claim 22, Korgel further discloses the pump source is a broadband optical pump source ([0151]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao in view of Grubb et al. (US 5905745).

With respect to claim 26, Zhao teaches the laser device outlined in the rejection to claim 20, including the use of a grating (fig.6). Zhao does not teach the use of separate highly reflective, and partially reflective gratings. Grubb teaches an Er doped gain medium which has a highly reflective grating, and a partially reflective grating (fig.1, col.3 lines 29-41). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser device and grating of Zhao with the multiple gratings of Grubb in order to add an additional degree of reflection at the end faces, and wavelength control via the multiple gratings.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao.

With respect to claim 29, Zhao teaches the laser device outlined in the rejection to claim 20, including the use of an array structure ([0067]). Zhao does not specifically teach the waveguides to be found on a common substrate. It would have been obvious

to one of ordinary skill in the art at the time of the invention to place the multiple laser array of Zhao on a single substrate in order to allow for increased power output from a single compact device.

Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao in view of LaCourse et al. (US 5228050).

With respect to claims 30-31, Zhao teaches the array of lasers as outlined in the rejection to claim 29, but does not teach the use of multiple wavelengths. LaCourse teaches a multiple wavelength laser device wherein cavity length is used to control the resonant characteristics (abs.). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser array device of Zhao with the multiple wavelength varied resonant cavity design of LaCourse in order to make the device more suited for used in a wavelength division multiplexing system (LaCourse, abs.).

Claims 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao in view of Morimoto et al. (US 4878223).

With respect to claim 37, Zhao teaches a thin film containing REDGIVN (fig.3 #106) and having a plurality of waveguides defined by channels on a substrate (via the array structure ([0067])), one or more feedback elements (facets) for providing optical feedback to the waveguides to form a respective laser resonator cavity in each wave guide with a distinct resonance characteristic to provide lasing action at a selected

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wavelength when pumped (selected wavelength can be any value, all same, all different, etc.), wherein injection of pump light at one or more suitable wavelengths into the laser resonator cavity causes output of laser light at the selected wavelength (fig.3) in accordance with a longitudinal cavity mode of the cavity (inherent). Zhao does not teach the waveguides to be located in the substrate. Morimoto teaches a laser array device wherein the active regions are located in waveguides within the substrate (fig. 1a/b). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the waveguide on the substrate array of Zhao, with the waveguide in the substrate array of Morimoto, to insure flat and uniform active layers which will allow for a synchronous phase mode output (Morimoto, col.2 lines 25-37).

With respect to claim 39, Zhao and Morimoto teach the laser array device outlined in the rejection to claim 37, and Zhao further teaches the laser resonator cavities have a plurality of widths (can be anything) on a substrate surface to thereby define a plurality of effective indices of refraction for the cavities, the wavelength of a longitudinal cavity mode being dependent thereon (inherent).

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao in view of Morimoto and further in view of Miyokawa et al. (US 20020009113).

With respect to claim 38, Zhao and Morimoto teach the laser array as outlined in the rejection to claim 37, but do not teach the use of a ferrule and optical fiber coupled to each waveguide for receiving the output light. Miyokawa teaches a laser device with a single ferrule and optical fiber for capturing output light from a laser device (fig.1). It

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would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser array of Zhao and Morimoto with the ferrule and fiber system of Miyokawa, as well as to use the system with each waveguide, in order to properly secure the fibers for stable coupling of the light, and to allow for transmission of the light for information sending purposes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

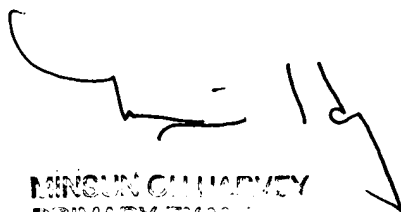
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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